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ECONOMICS RESEARCH NEEDS RELATED TO WILDLAND MANAGEMENT AND DEVELOPMENT IN THE MOUNTAIN STATES

by

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In this semiarid to arid climate more and more lands are being irrigated to increase and stabilize agricultural income. As a matter of fact, more than half of all irrigated land in the United States is in the Mountain States. The West has been the locale of most of the big projects to harness streams for irrigation, power, industrial use, and domestic use. The problems and conflicts associated with developing this water are a reminder of how much the future of this area depends on the amount of it available and the way it is used. The struggle between California and several of the inland states for the waters of the Colorado River drives home the singular importance of water supplies to the hopes and aspirations of the Mountain States. One observer has gone so far as to say that should California get the share of the Colorado River water it claims "development of the resources of Colorado, Wyoming, and Arizona would be permanently prevented, and the Mountain West would be forever removed from the main currents of American economic life."2/ (Figure 1)

From almost any point of view the wild land resources look impressively important to life, income, and happiness in the Mountain States.

> Other states have a direct and vital interest in the wild land management of the Mountain region because this region supplies much of their water.

The Rocky Mountains are the main watershed of this Nation. The rivers that rise here, for the most part go beyond regional boundaries to become the lifeblood of other areas they pass through. The Missouri, Columbia, and Colorado Rivers in particular are among the great waterways of the Nation.

The interregional importance of water and the relationship of land management to water yields give the Mountain States wild lands and their management an importance far beyond any local values.

> Much of the land is publicly owned; thus the public has an especially great responsibility for developing sound policies and programs for the use and management of wild land resources in the region.

2/ America's New Frontier--The Mountain West, by Morris E. Garnsey. Alfred A. Knopf, publisher, New York. 1950

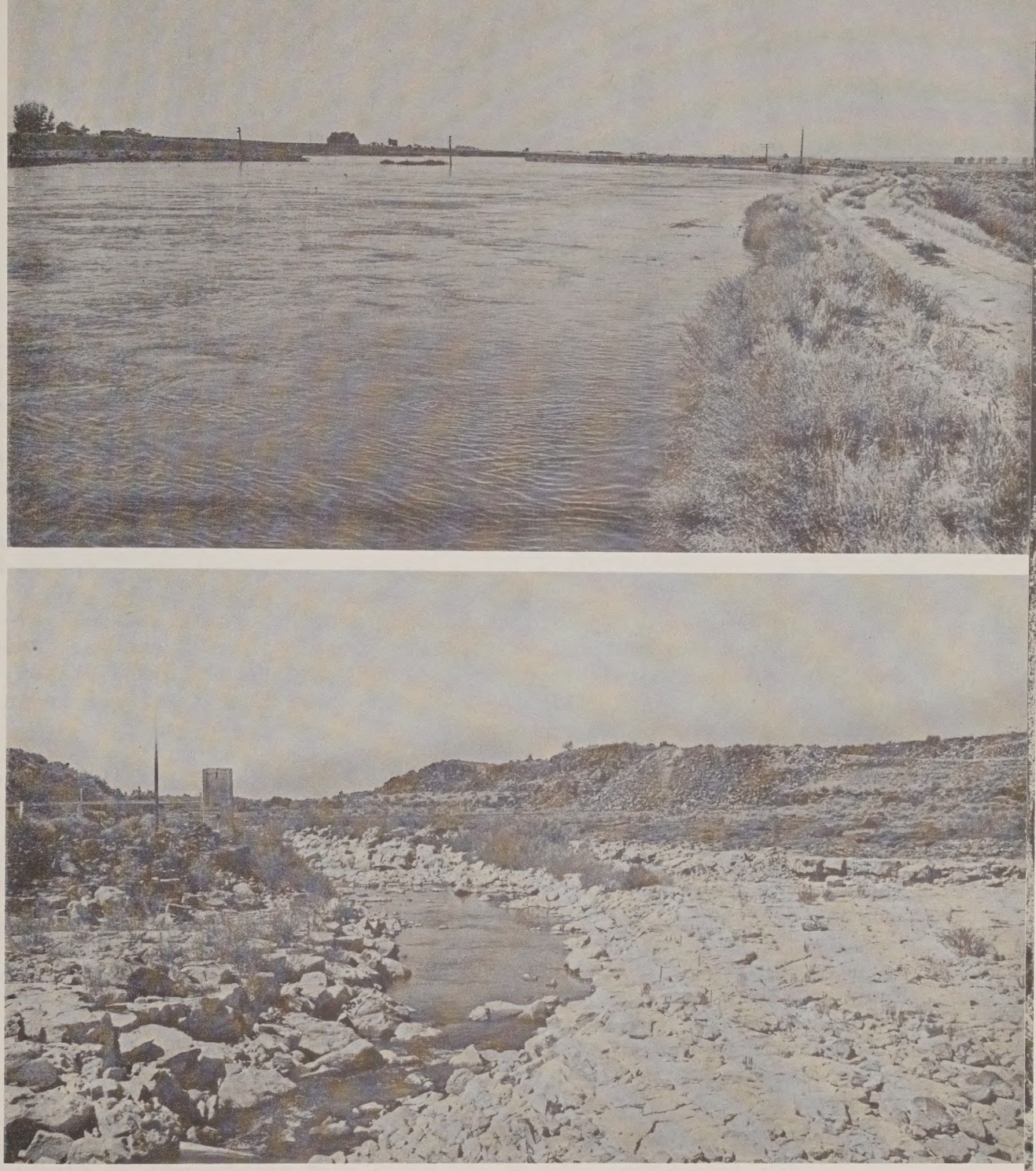

Figure 1. No one who has seen the intensive use of western streams would doubt the statement that water is the dominating influence in development of the West. The upper photo shows a brimful irrigation canal at Milner, Idaho on the Snake River. On September 1, 1955 five canals at Milner were drawing water from the river at the rate of 8,750 cubic feet per second. The lower photo shows that the Snake River below the take-off for these canals was reduced to a mere trickle--12 cubic feet per second.

Management of our natural resources involves two responsibilities: the responsibility of the landowners to handle these resources wisely, and the responsibility of the public to create the economic environment--that is the facilities, services, and conditions--which makes such management possible. One of the major features of the wild land picture in the Mountain States is that the public not only has the latter responsibility for the environment but the lion's share of the land ownership responsibility as well. Because productive capacity for commercial products has in general been low and public values high, proportionately more of the land area has remained in public hands in the Mountain States than in any other part of the Continental United States. National forests, national parks, grazing districts, other federally owned or managed lands, and the holdings of the 8 states add up to about 350 million acres. Two out of every 3 acres in the region today are the property of the Federal government and the states. If any underlining is needed we might add that these 2 out of 3 acres include most of the critical watershed area in the region. (Figure 2)

It is also significant that a major portion of the Federal government's land ownership responsibility lies in these 8 states. Federally owned or managed properties in the Continental United States include a total of 456 million acres. Two-thirds of that area is in the Mountain States.

The responsibility associated with land ownership has two aspects: the responsibility to conserve and protect and the responsibility to develop. Resources which are abused cannot make a full contribution to the economy of the country. Neither can resources held in idleness. Because the drive for conservation was for decades spearheaded by government agencies, the responsibility to conserve has on the average been fairly well met on public lands. On the other hand, the public is several decades behind private owners in developing its resources. There are good and logical reasons why this is so. Nevertheless the amount of Federal and state land in the region and the dependence of the Mountain States on this land constitute a tremendous challenge to the agencies that manage it to develop dynamic policies for using the land as well as protecting it.

> The physical margins are narrow; thus the resilience of the Mountain States as an environment is low, and the land resource is particularly susceptible to damage from overuse or misuse.

Figure 2. The public equity in the wild land resources and the public responsibility for their development are nowhere any greater than in the Mountain States where 2 out of every 3 acres are managed by the Federal government and the states.

The ease with which unwise use can destroy land values is dramatically emphasized in certain Utah watersheds where several generations of overgrazing have upset the natural balance to the point where floods and mudflows follow summer cloudbursts. Vulnerability to damage is not confined to Utah nor to grasslands, however. It is a general problem in the region. Civilization has come closest to completely destroying its environment in those parts of the world where the annual precipitation is low. The climate of the Mountain States falls under the general heading of "dry." Even in those areas that have more abundant precipitation, summer dryness,

abetted by a short growing season, prevents the vegetation from reaching the luxuriance achieved in many other parts of the country. Where vegetation is light, slopes steep, and soils erodible man must walk carefully if he is to avoid destroying his own environment. (Figure 3)

The economic margins also are narrow insofar as return to the land is concerned.

The resources of the Mountain States have been used ever since white men moved into the country. At first, only furs, buffalo hides, and gold could pay the freight. Over the years, utilization has expanded progressively to include more of the resources. Today we are shipping out timber, copper, beef, and a multitude of other products. But even so, distance to mill and to market, operating difficulties associated with mountainous country, and low productivity per acre combine to prevent full use of the wild land resources and to keep the operating margins lower than if the same resources were located in other regions.

In the long run, the growth of the West and the Nation and technological progress should diminish these handicaps. Nevertheless, the present prospect is that this economic weakness will persist for a long time, and so long as it does persist it will tend to aggravate land abuse and to shortchange land management. As an example, we can point to forest areas that have been left in poor shape following logging because there was no market for some of the usable wood and because the timber operations were unable to finance the cultural measures needed.

Multiple use and integrated use are particularly urgent in the Mountain States.

The close relation between life in the valley bottoms and the amount, timeliness, and quality of the water from the mountains; the ease with which land values and water values can be impaired; and the inability of commercial crops in some areas to carry all the land management costs by themselves make multiple use a pressing consideration.

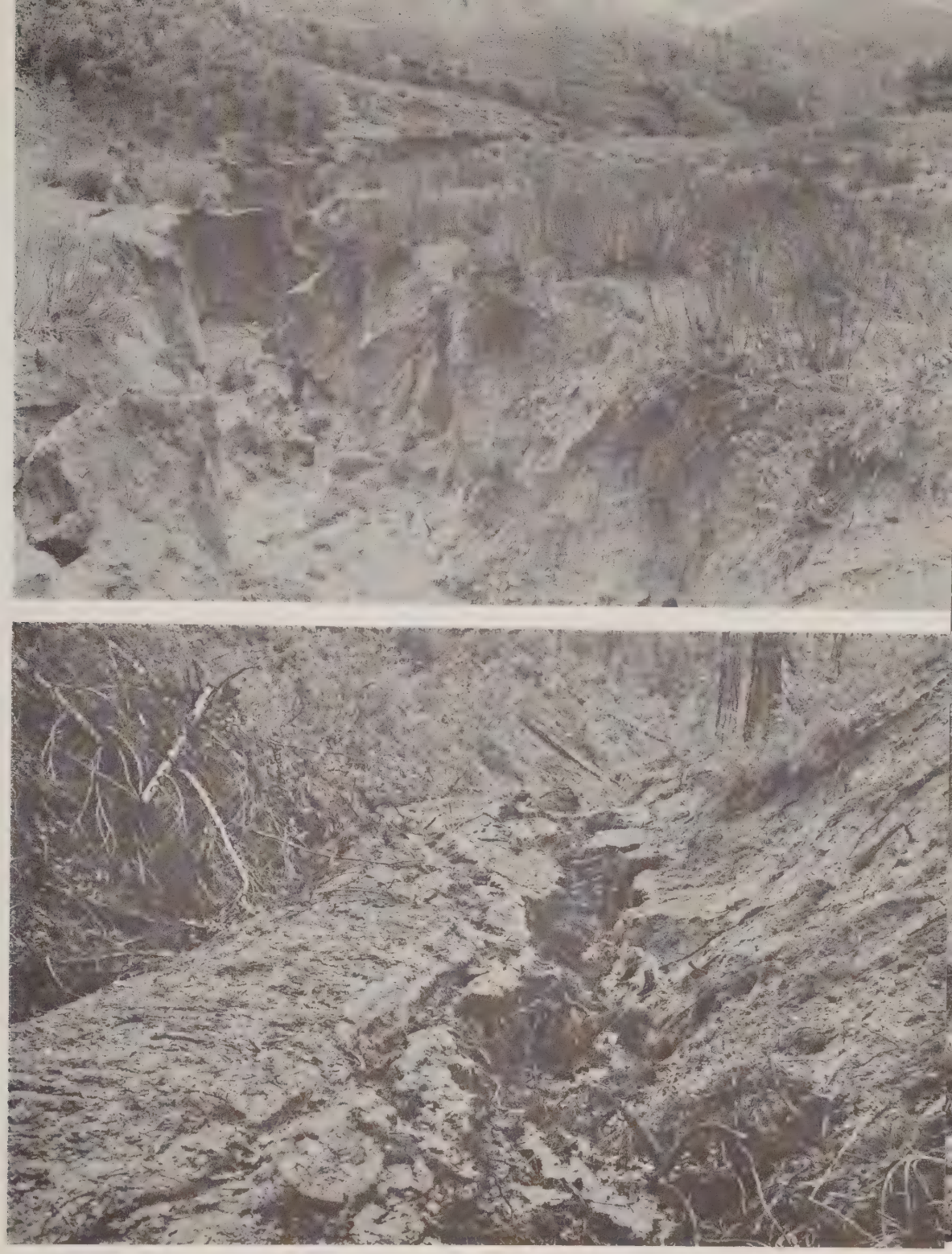

Figure 3. Excessive use or careless use of the land where the slopes are steep and the soils erodible can have quick and unfortunate repercussions. The upper picture shows a deep gully in Utah which resulted from overgrazing the watershed above it. The lower picture shows a striking example of the damage that can result from poor logging practices.

The fact that direct values must be weighed against indirect values and private values against public values makes multiple use an extremely complex thing. Development of sound multiple-use programs is no doubt the most important part of resource management as well as the most difficult.

> We are still in the formative stages of resource development; so both the responsibility and opportunity for sound planning are doubly great.

The grass of the Mountain States has been heavily used, but much timber, water, and minerals is yet to be developed. New industrial plants and some new communities will be built to utilize these raw materials. We will be establishing patterns of use which will persist for decades to come and decisions made during the next few years by land managers, governmental agencies, and industries will be molding an economy. The decisions on matters such as: what kind of industrial plants should we have? how big should they be? and where should they be located? will affect the lives and welfare of many people. Sound economic information will never be any more important and influential than now and in the next few years. (Figure 4)

A PROGRAM FOR ECONOMIC STUDIES

The task of handling the wild lands of the Mountain States is as complex as it is big. If most is to be made of these resources the complexities will have to be unraveled. We will need to develop a better understanding of resource capabilities, potentialities, and limitations. There are many technical and economic questions to be answered.

In the past few decades considerable progress has been made in answering the technical questions related to wild land management and development. Knowledge of the economic aspects of the problem has expanded more slowly. A review of the activities of economic researchers over the years reveals this type of research has lagged behind other wild land studies. Consequently, there is today a deficiency of experience, background, and "know how" in this field.

For the next few years at least, it would appear the efforts of economics research in the Mountain States should be directed toward helping to answer some of the following broad and basic questions:

- What are the extent and utility of the wild land resources?
- What contribution can they make now and potentially to the economy of the states and the Nation?

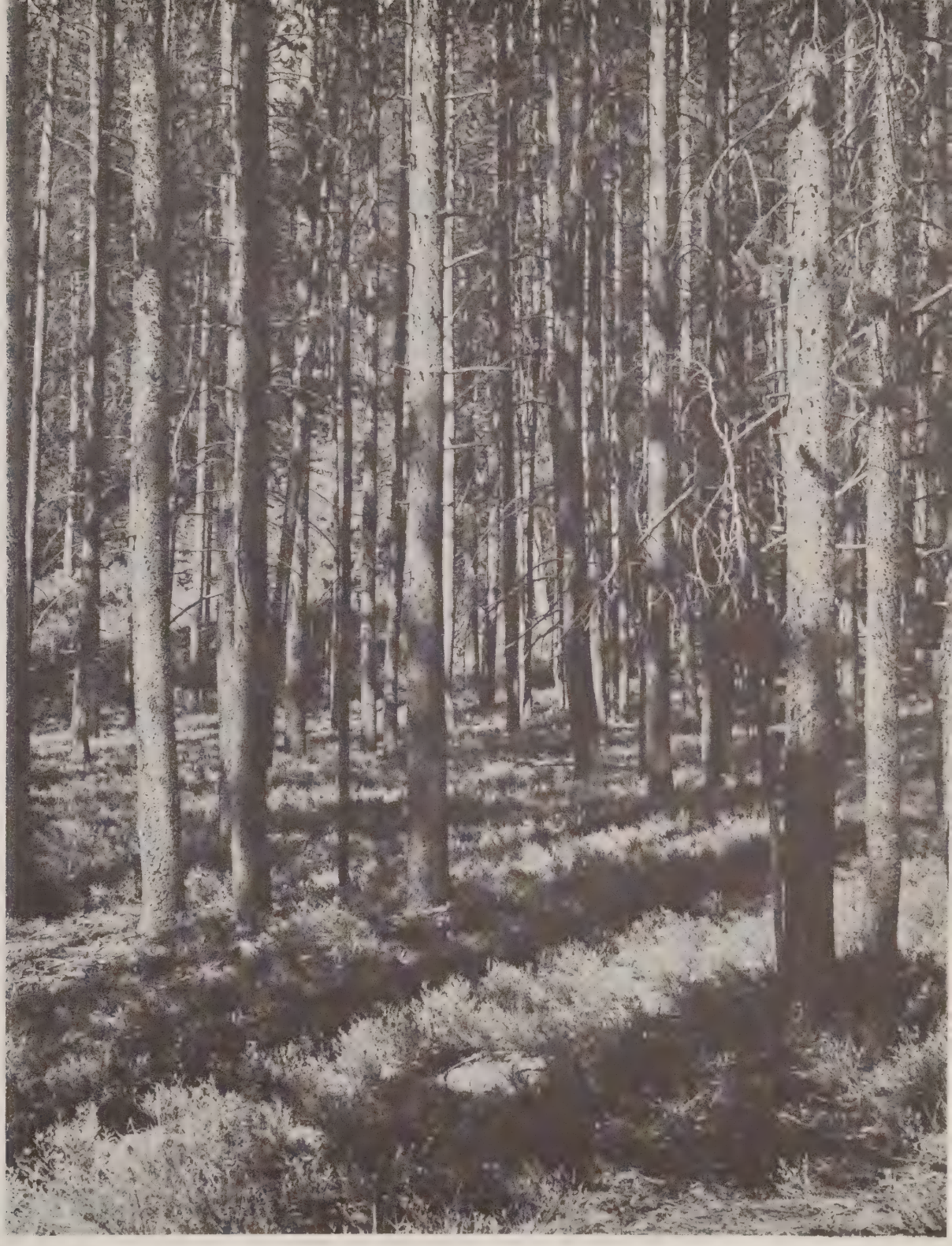

Figure 4. Lodgepole pine--a coming wood. Buffalo no longer range over the prairie, the copper mines of Butte, Montana sink a mile into the earth, white pine has been a sought after species for half a century. Nevertheless, other of the Mountain States' resources have yet to come into their own. Timber industries, for example, are just awakening to the opportunity that lies in the hundreds of thousands of acres of lodgepole pine such as pictured here.

- What are the opportunities for multiple use?

- When conflicts occur between uses how shall priorities between them be established?

- How much effort and expense for protecting, developing, and enhancing the productivity of the wild land resources can be justified by social and economic values?

- What criteria should be employed to judge the alternatives for developing the wild land resources?

Each of these questions has many facets. Rather than attempt to itemize all of the studies that might be undertaken, we have listed a few specific studies that illustrate the range of possibilities. These are only examples and some of them overlap. No attempt has been made to indicate priority. In the main, the projects undertaken for some time to come should be those having the most immediate policy implications. Following is a list of the sample projects briefly discussed in the following pages:

1. Place of national forests in the economy.

2. Pulp mill opportunities in the Inland Empire.

3. Timber industry opportunity in southeastern Idaho and western Wyoming.

4. Proper emphasis for multiple-use management of Utah's mountain watersheds.

5. Timber requirements and forest management objectives.

6. A desirable stand improvement program.

7. Use of planting in stand regeneration.

8. Pruning.

9. The place of wildlife in land management at Jackson Hole, Wyoming.

10. Chipped wood residues.

11. Wood transportation by truck.

12. Marketing Rocky Mountain timber.

13. Forest pest control.

14. Evaluating the range resource.

1 PLACE OF NATIONAL FORESTS IN THE ECONOMY

As the United States has grown in the past half century and has developed a progressively larger appetite for natural resources the national forests have gradually come into their own. The greater use and importance of the forests have added to the administrators' responsibility to develop sound programs of multiple use. Unlike the private owner, whose success is readily measured in terms of the money he makes, the national forest supervisor must measure his accomplishments in terms of their contribution to the welfare of the communities in and near his forest and also in terms of national welfare. His judgment in this respect is made difficult by the fact that the values he must weigh are of many kinds, some of which are hard to measure, and all of which are no more easily compared with each other than horses and apples.

The problem of orienting national forest administration is as big as the forests themselves and it has many, many aspects. How should the many uses of the national forests be coordinated? Is the range management on the forests integrated as well as it might be with the local ranch economy? How large a timber industry will the national forests support? What kind and scale of watershed management program is desirable? These questions and a thousand more are relevant, and of course much of our future economics program will be devoted to answering them.

One project that would help clarify the over-all picture and contribute to more purposeful management would be a study of the place of the national forests in the local and national economies. Such a study would have two broad phases: (1) the value and importance of the resources in the national forests, (2) the relation of national forest management and policies to the economy of dependent communities.

Orientation of project

Such a study might cover the following subject matter:

- Present use of national forest resources.
- Potential productivity of the timber, range, and other resources of the national forests.
- Present contribution of the national forests to local communities.
- Potential contribution of the national forests to these communities.
- Programs and policies required to bring out the full contribution of the national forests.

Discussion

Some of the information could be gathered on a regional basis. However, the relation of national forests to the people who live near them could be learned best by selecting one or two forests for case studies.

2 PULP MILL OPPORTUNITIES IN THE INLAND EMPIRE

There continues to be interest in the opportunities for pulp mill development in western Montana, north Idaho, and northeastern Washington. At present western Montana has no such plant. Potlatch Forests, Incorporated, operates one pulp and paper mill in Lewiston, Idaho, and the Inland Empire Paper Company operates a pulp and paper mill at Spokane, Washington. Obviously sufficient raw material is available in the Inland Empire for several more plants, but we still lack clear-cut answers to some important questions: How much wood might be available for pulping? What kinds? Where are the wood supplies located? Where are the desirable pulp mill sites? To what extent is this region financially attractive to pulp mills? Some aspects of this last question can be answered only by the companies that are considering locating in the Inland Empire. We are in a position, however, to answer the other questions.

Orientation of project

A study of pulp mill opportunities in the Inland Empire should include the following factors:

- The types and species of round wood available for pulping in the Inland Empire, and the suitability of each for this purpose.
- Sawmill residues that would be available for new pulp mills.
- Sustainable output of wood of each type in various parts of the Inland Empire.
- Wood consumption patterns of the existing plants.
- Desirable pulp mill sites from the standpoints of water supply, labor, and transportation.
- The pulpwood capacity that could be located at each site without risk of undue water pollution.
- The allowable annual production of each type of wood tributary to each pulp site.

Discussion

A study of this problem was started in 1952 but was set aside for the purpose of helping the regional forester's office at Missoula in an analyses of the Libby Dam problem. The usefulness of a similar study for eastern Montana and continued requests for this type of information relating to the Inland Empire have led to the suggestion that the project be undertaken again.

3 TIMBER INDUSTRY OPPORTUNITY IN SOUTHEASTERN IDAHO AND WESTERN WYOMING

The forests of southeastern Idaho and western Wyoming have been utilized only slightly for timber products. However, the recent growing interest of industry in Rocky Mountain timber has revived hope of considerable industrial development. There has been much discussion of the possibility of a pulp mill or two, medium-size sawmills, and hardboard plants.

In view of the current optimism and interest in timber industry expansion it becomes important to know how much of an industry the forests can support and what type of development would produce the greatest benefits in the long run. In view of the economic problems handicapping this region, it certainly seems wise to explore as many angles as possible before embarking on any major program. A careful analysis of the area and its problems and opportunities should be especially helpful to new industries seeking to locate here. Furthermore, there is an unusual chance to develop the timber resources of this locality in a planwise manner because practically all of the timber is in the national forests and most of the developing is yet to be done.

Orientation of project

This study can be subdivided into the six phases indicated below:

- Appraisal of the long-range market outlook for Rocky Mountain timber.
- The relative feasibility of various types of industrial development, primarily pulp mills, hardboard plants, and medium-size sawmills.
- Local considerations that make each type of industrial development more or less desirable.
- Sustainable production of different kinds of timber.
- The long timber haul problem in areas not served by railroads.

- The possibilities for coordinating the wood procurement of the several timber industries to get better and more complete use of the timber than would otherwise be possible.

Discussion

This region is just now coming into its own as a timber producer. There is therefore an opportunity to avoid hit-or-miss industrial expansion. Thorough analysis of the situation should provide some guidelines helpful in orienting future policies and programs.

4 PROPER EMPHASIS FOR MULTIPLE-USE MANAGEMENT OF UTAH'S MOUNTAIN WATERSHEDS

Mountain watersheds in Utah have been used for almost a century. This use has caused deterioration which has in some localities been severe to the point of causing serious erosion and floods. Because of physiographic, ecologic, and climatic conditions, the mountain slopes in Utah are relatively sensitive; that is, their equilibrium can be upset by less human use than in places having greater climatic and physiographic stability. For this reason the primary question in management of the national forests here is: What kind of use and how much use can be made of these lands without creating adverse effects that are greater than the benefits?

A corollary question is how much management expense can be justified by the value and importance of the resource? Watershed and range management experts and ecologists have spent many years gathering the physical facts relating to these questions. However, much remains to be done in the way of arranging these many facts and factors in their proper relation to each other and making value comparisons before the physical problem can be properly translated into program and policy decisions. To say it somewhat differently, the greatest contribution that can be made now would be to bring our technological knowledge into clear focus in socioeconomic terms.

Orientation of project

A study of this sort would attempt to answer the following questions:

- To what extent does the State of Utah depend upon the products of the mountain watersheds for existence and livelihood? What is the relative contribution--past, present, and future--of water, wildlife, grass, timber, and the other resources of the national forests to the State?

- To what extent has use of the resources resulted in deterioration?

- What degree of continued use is tolerable?
- To what extent do water values or flood and erosion problems justify deemphasis of nonwater uses?
- What broad programs and policies relating to management of this land will best serve the interests of the State?

Discussion

The considerations involved in this problem are complex and confusing. Yet, they are the most fundamental issues in wild land management in this locality today. It is to be hoped that a study of this sort would as a minimum develop some broad answers and provide a pattern of study for further refinement of our thinking on the subject in years to come.

We are in a particularly good position to make such a study in Utah because a great deal of basic range, ecological, and flood control research has been done in this area, and the history of Utah's watersheds is well documented.

5 TIMBER REQUIREMENTS AND FOREST MANAGEMENT OBJECTIVES

Managing the forest lands of America to meet national timber needs is a large and difficult job. It is a big job because of the size of the total forest resource and timber requirements. It is a difficult job, first of all, because of the time required to produce timber. We must always be planning for sometime in the future, and the future is full of uncertainty. Second, much of the timber produced is consumed in markets so far away from the forest that it is hard for the forest manager to interpret market needs and trends. Third, because of the size of the total forest resource, the significance of the particular forest unit in the over-all production of timber products cannot be ascertained easily.

The job of making forest management plans would be made significantly easier, and many deficiencies in planning would be corrected if an advance study were made of the economic factors affecting the future development and use of the forests in the region. Periodically, attempts have been made to assess the over-all forest situation in the United States. During the past 35 years there have been the Capper Report of 1920, the Copeland Report of 1932, the Joint Congressional Committee Report of 1938, and the Reappraisal Report of 1945. The Forest Service's latest and most comprehensive effort of this type is now near completion. National appraisals of future timber needs have also been made by the President's Materials Policy Commission and the Stanford

Research Institute. Because of the better forest inventory data now available and the improved techniques and methods for assessing future demands for timber products, these current appraisals should be helpful in regional and local forest planning.

Orientation of project

In the course of the recent national studies, trends in the use of forest products were studied along with population trends and other factors that will affect future consumption of timber products. The forest inventory, the rate the timber is growing, and the rate it is being cut and destroyed were also analyzed. The study proposed here is that of interpreting the national appraisals as they apply to the forests of this region. The net result of this study should be to establish the broad descriptive economic framework into which the management of each forest unit in the region could be fitted. The following points should be considered:

- The inventory and growth potential of each national forest of the region.
- Current rates of cutting on each forest.
- Natural and economic factors affecting the development and use of the timber in the Rocky Mountains.
- The development that will be required in each national forest if the country is to satisfy its future timber demands as now foreseen.

Discussion

The several recent analyses of long-range timber requirements and long-range productive capacity of the timberland have been mainly on a national basis. Further study is necessary to interpret the regional and local significance of these long-range comparisons.

6 A DESIRABLE STAND IMPROVEMENT PROGRAM

Forest management in the Rocky Mountains is still a far cry from tree farming in the literal sense of the expression. Only part of the cultural measures which might be carried out to increase quantity and quality of timber yields are actually in practice to any extent. However, the time is rapidly approaching when we will have to consider the desirability and feasibility of more intensive cultural practices such as weeding and thinning. In large part this is a problem for forest management research, but superimposed over the technical problems is the economic question: How much stand improvement work can we afford to do, and how much should we be doing? Any answer certainly must be related to the long-range timber supply outlook and future timber product needs.

Orientation of project

This activity should be shared with forest management researchers. There is opportunity for both short-range and long-range studies. These studies should shed light on the following specific topics for the individual types of timber:

- The cost of stand improvement measures.
- The values created by these measures.
- The relative desirability of stand improvement work, and the amount of this work which is appropriate.

Discussion

Decisions on whether to do stand improvement and how much to do are becoming increasingly important. The present low intensity of silvicultural practice may in fact represent a default in part of our responsibility for future timber supplies. Any information on feasibility and desirability of stand improvement measures would be very helpful to policy makers.

7 USE OF PLANTING IN STAND REGENERATION

In some localities it takes a long time for new stands to become established after logging. This means the land lies idle or partially idle for a period of years. As the wood requirements of the country increase and as the timber supply becomes tighter, idleness of forest land will become less acceptable. However, the alternative to idleness is planting, which is expensive, especially where much land preparation must be done in advance. The issue therefore is: At what point is it more desirable to establish the next stand by planting rather than to wait for the slower natural regeneration.

Orientation of project

Any study of the economics of planting should be done in collaboration with forest management research. The studies should be directed toward solving the following problems for the individual timber types:

- Time expectancy of natural regeneration under local circumstances.
- Costs of planting.
- Cost involved in waiting for natural regeneration.
- Ultimate stand values resulting from each practice.
- Criteria for determining when to plant.

Discussion

Knowledge of planting techniques has advanced to the point where planting can be done with reasonable assurance of success in many Rocky Mountain forests. However, there is considerable uncertainty of opinion about when planting is desirable in stands following logging. Any study that sets up some economic guidelines would aid forest administrators in developing a policy for replanting.

8 PRUNING

In 1950 the Northern Rocky Mountain Forest and Range Experiment Station prepared a research note, "The Profit In Pruning Western White and Ponderosa Pine." This study indicated that pruning of these species probably would be a profitable enterprise. There is other evidence that pruning may be worth while. Plywood industry estimates from the West Coast indicate it costs about 2-1/2 cents for every patch which must be placed on a sheet of veneer because of knots or knot holes. One radial inch of knot in a log affects the quality of 10 sheets of veneer; thus the patching cost resulting from that 1 inch of one knot is 25 cents, or about the same as the cost of pruning an entire 16-foot butt log of a young Douglas-fir. The question is: Has the time arrived when we should practice pruning as a regular part of our management job.

Orientation of project

Any study of the economics of pruning should be done in cooperation with forest management research. The studies should be directed to the following problems for each species:

- Cost of pruning.
- Effect of pruning on grade recovery, including the relation of the pruning operation to cull factors.
- Probable value of pruned timber in comparison to the probable value if no pruning were done.
- Guides for determining when to prune and how much pruning to do.

Discussion

Past studies of pruning in the Mountain States are certainly no more than indicative of the general opportunity. More facts and figures are needed to help the administrators decide rationally how much pruning to do.

9 THE PLACE OF WILDLIFE IN LAND MANAGEMENT AT JACKSON HOLE, WYOMING

The elk herd is a major resource on the Teton National Forest in Wyoming. The herd, estimated at between 16,000 and 17,000 head, is a national attraction and an asset to the local economy. However, some wildlife and range managers have pointed out that overpopulation of elk combined with heavy use by domestic livestock has depleted the range and created a serious land management problem. They have questioned whether such a large elk herd and the consequently large feeding program required to sustain the elk over winter could be justified if all the disadvantages were weighed against the advantages.

Opinions about the Jackson Hole herd have been sharply divided for some time. However, existence of the controversy merely underlines the desirability of determining the proper place of the elk herd in the land management of this area.

Orientation of project

This study should answer the following questions:

- What is the relative importance of the various wild land uses in the Jackson Hole area?
- To what extent is there conflict between uses?
- To what extent do the uses cause undesirable pressures on the land resource?
- What alternative management programs could be used to reconcile conflicts in land use?
- What are the economic advantages of each of the alternative programs to various groups such as ranchers, businessmen, sportsmen, the whole community, and the Nation?
- What are the other apparent advantages, in addition to the economic, of the alternative programs?

Discussion

Local communities, the Forest Service, the Wyoming game department, the U. S. Fish and Wildlife Service, the National Park Service, the Conservation Foundation, University of Wyoming, the Wildlife Management Institute, and possibly other groups have a deep interest in this problem. For that reason, any economic studies undertaken would probably be most fruitful if done cooperatively by several of the interested groups.

10 CHIPPED WOOD RESIDUES

Perhaps the outstanding timber industry development in recent years has been the use of sawmill and veneer mill residues for pulping in the West. The one big pulp mill in the Mountain States operates mainly on such material. This mill, owned by Potlatch Forests, Incorporated, at Lewiston, Idaho, is operating on chips obtained not only from "company" sawmills but from other sawmills some of which are hundreds of miles away.

The trend toward greater use of wood chips from residues is one of the most significant recent developments in wood utilization. The chips provide an additional revenue for the sawmills and veneer mills producing them and an economical raw material for the pulp mills. The net effect is to improve the competitive position of the plants able to take advantage of this arrangement and to get more complete use of the timber.

The basic question raised by these developments is to what extent the use of wood residues can be expanded to promote industrial development and improve the position of the timber industries. Much of the answer lies in the economics of producing and transporting chips.

Orientation of project

A study of use of chipped wood should include the following points:

- Cost of producing and shipping chips.
- Price paid for chips.
- Volume of chippable material available at sawmills.
- Increase in revenue to sawmills provided by a chip market.
- The break-even point between chips and round material so far as pulp mills are concerned.
- Extent to which pulp mill locations should be influenced by chip supplies.

Discussion

Pulp mill utilization of wood chips is a new development in the Mountain States. It appears to offer an opportunity for improving the economic position of the timber industries and for that reason is worth careful study.

11 WOOD TRANSPORTATION BY TRUCK

Transportation is the largest and most variable element of cost in wood procurement in the Rocky Mountains. Operability of timber stands in this region is dependent more upon the cost to move the timber from stump to mill than upon any other single factor. The importance of transportation costs necessitates understanding them completely and offers a particularly big opportunity to reduce costs of wood procurement by increasing the efficiency of log hauling.

In 1947 Byrne, Nelson, and Googins of the Pacific Northwest Forest and Range Experiment Station published the report, "Cost of Hauling Logs by Motor Truck and Trailer." This has been a best seller and an invaluable reference for persons interested in transportation costs. However, there is need for additional information on certain aspects of trucking costs.

Orientation of project

In the Rocky Mountains, because of the long trucking distances, two aspects of trucking need special attention:

- What is the relationship of distance of haul to transportation costs?

- To what extent does the approach to highway planning and truck transportation in large western areas not served by railroads take proper account of the absence of rail facilities?

Discussion

These transportation problems illustrate the opportunity for useful economics research in wood procurement. Expansion of timber industries in the Rocky Mountains makes it increasingly important to understand the relative efficiency of different logging methods and situations and to have accurate cost information for timber appraisal purposes. Much of the responsibility for gathering such information belongs to administrators, engineers, and operators themselves. However, because of his training in analysis and an opportunity to apply continuous attention to specific problems, the economics researcher can also contribute a great deal in this field.

The industrial limitations of the Rocky Mountain forests arise mainly from marketing problems. Intrinsically the timber in this region is good--better than some of the timber being utilized elsewhere. Yet much of it is difficult to market. Wood products must be shipped long distances in some cases, making for high transportation costs. This has created a competitive handicap which has held back timber development. Although much has been said over the years about the timber marketing and transportation problems of the Rocky Mountains they have received relatively little attention from researchers. It appears there is much to be gained from a better understanding of the marketing factors in the utilization of Rocky Mountain timber. Certainly the hopes for full development of the timber resource depend upon our ability to overcome economic problems which arise from the marketing situation.

Orientation of project

The following are some of the aspects which should be analyzed in studies dealing with marketing:

- The value of some of the less utilized species for lumber as indicated by grade recovery possibilities.
- The relation of freight rates to the distribution of Rocky Mountain timber products and a comparison of timber product transportation costs of this region and others.
- Opportunities for developing further outlets within the Rocky Mountain region for Rocky Mountain timber.
- The long truck haul problem in marketing Rocky Mountain timber.
- Opportunities for improving the competitive position of Rocky Mountain timber industries through integrated utilization.

Discussion

This region has the usual problems of how to improve the competitive position of the markets of individual landowners and industrial plants. It also has the larger and even more fundamental problem of how to improve the competitive position of the region itself. A number of factors contribute to the present inability of the Mountain States to achieve full economic partnership among the regions. Some of the most important of them are marketing problems of the first magnitude.

The forests of the Rocky Mountains have been plagued by insects and diseases down through the ages. In the past half century these pests have on occasion mushroomed to disastrous proportions and killed billions of board feet of good timber. The most spectacular losses have occurred in overmature stands. Thus many foresters have felt the control problem will greatly diminish when the virgin stands have been cut over and the forests are on a managed basis. No doubt the total problem will diminish but it is also apparent that the task of insect and disease control will always be large. Billions of board feet of timber will be lost to insects and diseases in years to come. We will be exchanging problems of protecting virgin forests for those of protecting second-growth forests.

The prospect that we face a continuing major timber protection task makes it particularly important to develop properly oriented and properly scaled programs for combating insects and diseases. Development of such programs will probably depend mainly upon three factors: Techniques of control which are reasonably cheap as well as effective; an understanding of how far we can afford to go in protecting timber; stability and continuity of public efforts in forest protection.

There is still a great deal to be learned about how to control some of the insects and diseases but we know even less about how far we can afford to go with control. This question has many ramifications. It depends on what control efforts will cost--not just this year but also in years to come. It depends on what would happen if the insect infestation or disease epidemic were not battled--not only to the trees currently attacked but also to other trees in the future.

Long-run continuity of purpose and action has an importance sometimes overlooked. Year-to-year uncertainties and changes because of fluctuations in financing will disrupt any public programs. They can have a particularly bad effect on forestry programs where continuity is essential. This problem can be illustrated by a clear-cut example in the control of the white pine blister rust disease in the Inland Empire. This disease is controlled by pulling or otherwise eradicating wild currant and gooseberry bushes--a job which ordinarily must be done not once but several times before the problem is solved. However, many areas covered once in the past were not covered again in subsequent years because of lack of funds. On many of those areas the money spent on the original eradication effort was therefore wasted.

Orientation of project

Some of the major economic aspects of the forest protection problem are:

- Proportion of national timber needs which should be supplied by the forests of this region.
- Level of forest protection and management required to meet these timber growing objectives.
- Benefits and costs of different levels of protection and management.
- Alternative approaches to the protection problem.
- Extent to which timber values can carry the protection and management costs.
- Degree of protection justified by nontimber values.
- Extent to which public participation in the protection of private forests is desirable.
- Changes necessary to secure continuity of protection programs.

Discussion

Concepts of timber values have changed a great deal in the past two decades. For example, lodgepole pine which was once regarded as a weed species is now recognized to have an industrial future. Undoubtedly there will be further changes in our idea of timber values in years to come and as they change the protection programs we can justify will change also. However, that in no way minimizes the necessity for developing a means for appraising long-range protection needs and a program for establishing a level of protection commensurate with the forest land management objectives.

From the days of the first settlers the grasslands of the Mountain States have supported domestic livestock. These lands were, in fact, one of the first resources of the West to be fully utilized--in many cases overutilized. As a consequence of long and heavy use the problem in many places is how to repair the ravages of abuse and to adjust livestock and livestock use to the productive capacity of the land. Increasing attention must be given to the matter of balancing the livestock industry with the resource if the industry itself is to continue to flourish and if unnecessary impairment of watershed and other values is to be avoided.

In 1936 the U. S. Department of Agriculture made a complete and comprehensive analysis of the range situation in a document entitled "The Western Range." The history of range use, capabilities of the resource, problems, and programs were exhaustively analyzed. Though the findings of "The Western Range" were not completely accepted in all quarters, the report was an important step forward in an overall appraisal of the range resource. Relatively little has been done since then to supplement and amplify the studies of the economic aspects of range resource use. It may not be desirable to undertake a project quite so ambitious as the 600-page "The Western Range," but certainly many of the aspects studied at that time need further attention from range technicians and economists alike. Pressure on the range resource has increased and it will continue to increase as the population of the United States grows, carrying upward the demand for meat and other livestock products.

Orientation of project

The range problem has many ramifications but a few of the aspects which should receive attention are listed below:

- Longtime trends in livestock use of the range in the Mountain States.
- Present use of the range land by domestic livestock.
- Past and present contributions of the range resource to the wealth and welfare of the Mountain States.
- Estimated present capacity of the range to support domestic livestock.

- Effects of grazing on yield of usable water.
- Relation of range use to recreation use.
- Estimated carrying capacity of the range if damaged areas are rehabilitated.
- Problems involved in making coordinated use of private and public lands.
- Adjustments in the livestock industry which may be necessary for best use of the range resource.
- Appraisal of the impact upon the livestock industry of adjustments necessary for best use of the range resource.
- Economic appraisal of big game and domestic livestock use of the range resource.

Discussion

Controversy over "facts" as well as conclusions in "The Western Range" has no doubt tended to discourage subsequent study of over-all range resource management. The measurement of the physical factors of range land are considerably more difficult and involve considerably more personal judgment than measurements in forest stands. However, much progress has been made in the techniques of both measurement and sampling. This, and the increasing pressures on the resource make it highly desirable to expand activities in this field.